REPORT NO. 35
Issued November 1974

center for disease control

SHIGELLA

surveillance

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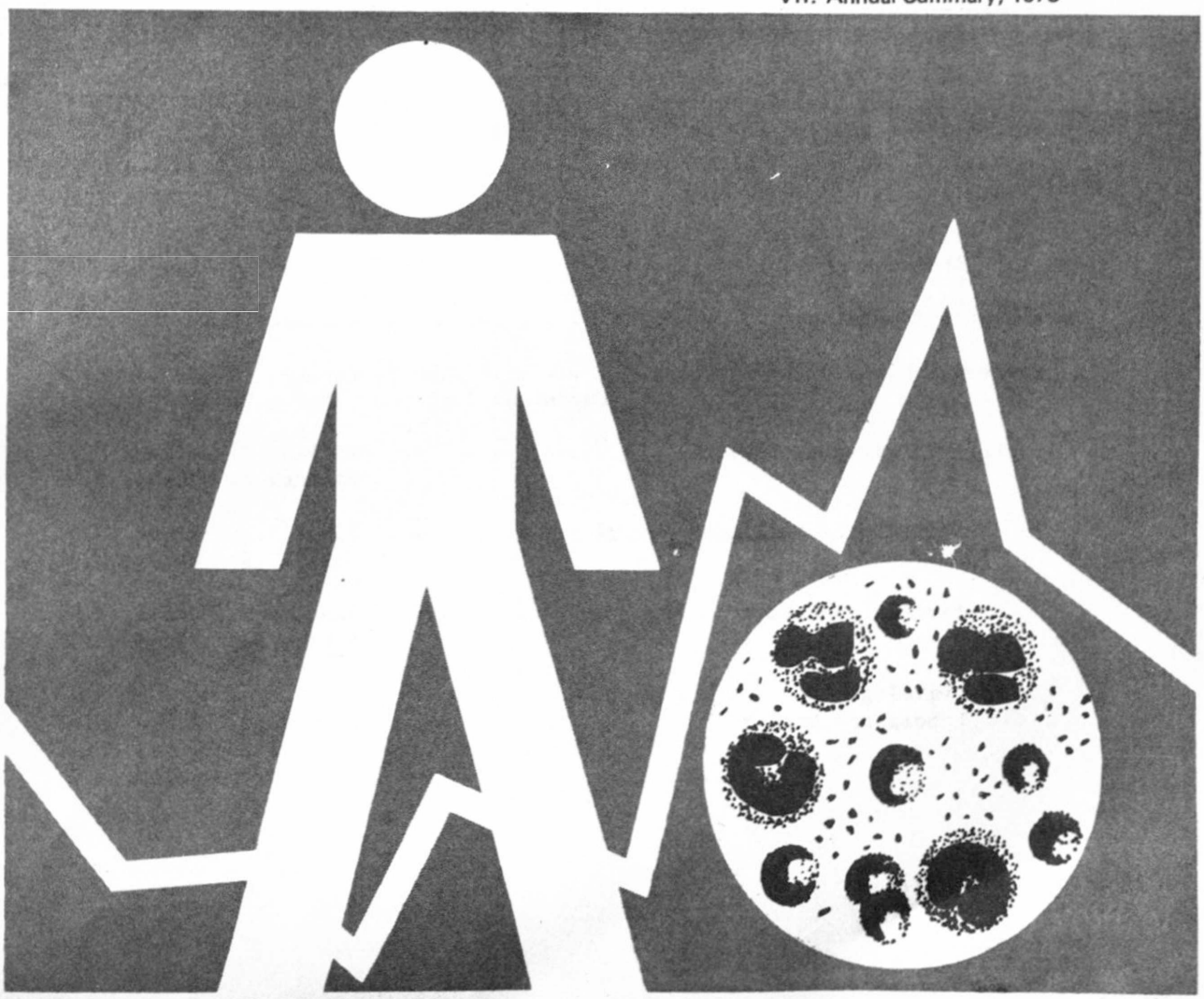
for the
Third and Fourth Quarters 1973



U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE: PUBLIC HEALTH SERVICE

PREFACE

This report summarizes data voluntarily reported from participating states, territorial, and city health departments. Much of the information is preliminary. It is intended primarily for the use of those with responsibility for disease control activities. Anyone desiring to quote this report should contact the original investigator for confirmation and interpretation.

Contributions to the surveillance report are most welcome. Please address to:

Center for Diseases Control
Attn: Shigella Surveillance Activity
Bureau of Epidemiology
Atlanta, Georgia 30333

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Center for Disease Control . . . . . David J. Sencer, M.D., Director

Bureau of Epidemiology . . . . . Philip S. Brachman, M.D., Director

Bacterial Diseases Division . . . . . John V. Bennett, M.D., Director
Eugene J. Gangarosa, M.D., Deputy Director

Enteric Diseases Branch . . . . . *William H. Barker, M.D.
Michael H. Merson, M.D.

Shigella Surveillance Activity . . . . . *Jack B. Weissman, M.D.
Mark L. Rosenberg, M.D.

Statistical Services . . . . . Stanley M. Martin, M.S.
Robert A. Pollard, M.A.

Epidemiologic Investigations
Laboratory Branch . . . . . George K. Morris, Ph.D., Chief
Donald C. Mackel, M.S., Deputy Chief
Joy G. Wells, M.S.

*Through June 1974

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I. SUMMARY

For the period July through December 1973, 10,216 shigella isolations from humans were reported. This represents an increase of 3,635 (55.2%) over the 6,581 isolations reported for the preceding 6 months and an increase of 2,730 (36.5%) over the 7,486 isolations reported for the corresponding months of 1972 (Tables I-A - I-B).*

II. REPORTED ISOLATIONS

A. Human

1. General Incidence

For the latter half of 1973, 64.8% of reported isolations were from children under 10 years of age (Table 1); this is consistent with previous 6-month periods. The highest rate of isolation was in the 1-4 age group.

2. Serotype Frequency

Fifty-three of the 54 centers participating in the Shigella Surveillance Program reported isolations of 26 different shigella serotypes.

Table 1

Cases of Shigellosis by Age and Sex,
Third and Fourth Quarters, 1973

Age (Years)	Male	Female	Unknown	Total	Percent	Cumulative Percent
Under 1	217	162	8	387	5.1	5.1
1 - 4	1595	1365	7	2967	39.0	44.1
5 - 9	781	793	2	1576	20.7	64.8
10 - 19	486	565	1	1052	13.8	78.6
20 - 29	316	589		905	11.9	90.5
30 - 39	173	259	1	433	5.7	96.2
40 - 49	56	64		120	1.6	97.8
50 - 59	23	46		69	.9	98.7
60 - 69	9	35		44	.6	99.2
70 - 79	11	28		39	.5	99.8
80 or Over	8	11		19	.2	100.0
Subtotal	3675	3917	19	7611		
Child (Unspec)	37	23	-	60		
Adult (Unspec)	12	34	-	46		
Unknown	1208	1320	42	2570		
Total	4932	5294	61	10287		
Percent	48.2	51.8				

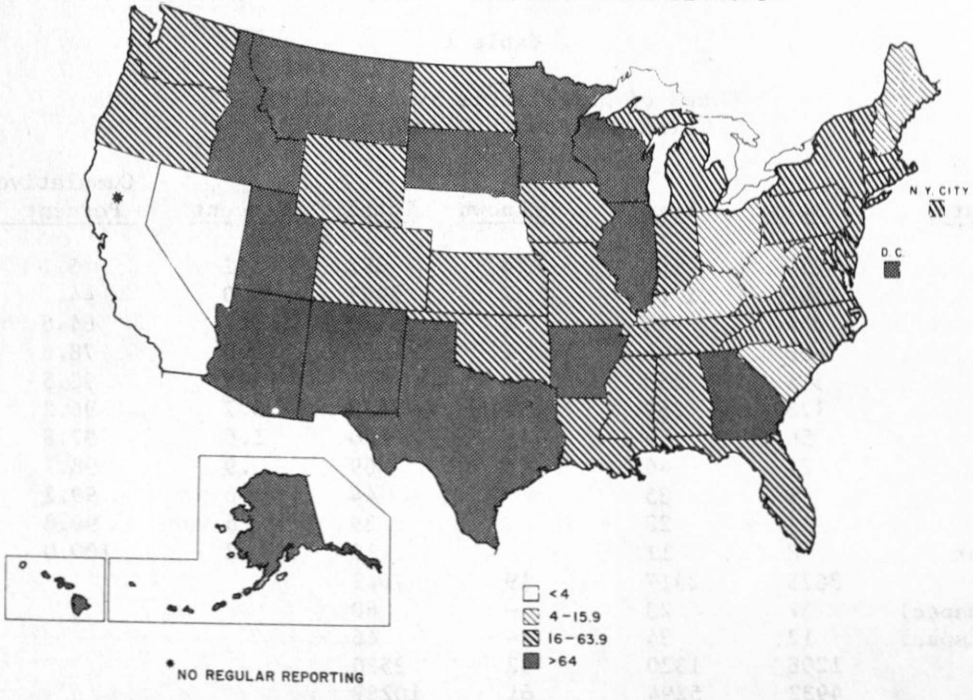
*No laboratory reports were received from California or the Virgin Islands. Reports of 71 additional isolates were received too late for inclusion in these tables, but are included in subsequent tables.

Isolations not serotyped were distributed among serotypes in the same proportions as the isolates that were serotyped (Table II). The resulting distribution is called the "calculated number," and from this is derived a "calculated percent" for each serotype. These provide approximate indices of the relative frequency of reporting of the shigella serotypes in the United States. S. sonnei accounted for approximately 84.4% of all reported isolations. The next most common serotypes were S. flexneri 2a (5.4%), S. flexneri 6 (2.2%), and S. flexneri 3a (2.1%). Table III shows the distribution by state of shigella serotypes reported from mental institutions.

3. Geographical and Seasonal Observations

Figure 1 shows the number of reported isolations (per million population) (1970 census data) by state for the period July through December. There were more reported isolations of S. sonnei than S. flexneri in all but the following 8 states: Montana (32:33)*, Nevada (1:1), North Dakota (10:12), South Dakota (23:48), Mississippi (22:25), Arizona (88:213), New Mexico (68:106), Hawaii (14:48). This is consistent with the previous observation that the reported incidence of S. flexneri is decreasing while the reported incidence of S. sonnei is increasing. The seasonal distribution, peaking in fall and winter, is depicted in Figure 2. Approximately 54.4 isolations per million population were reported for the latter half of 1973. Table 2 shows the general type of residence of those patients from whom shigella was isolated and reported.

Fig. 1 ATTACK RATES OF SHIGELLOSIS, BY STATE, JULY–DECEMBER 1973



*The first figure in parenthesis is the number of reported isolates of S. sonnei, the second is the number of reported S. flexneri.

Fig. 2 REPORTED ISOLATIONS OF SHIGELLA IN THE UNITED STATES

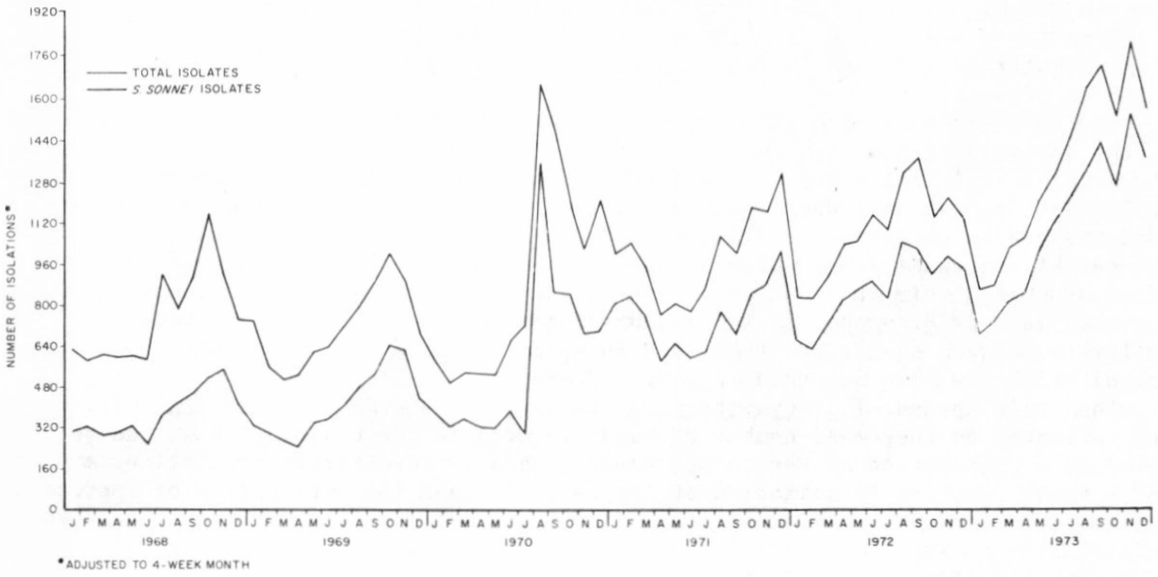


Table 2

Reported Isolations of Shigella by Residence at Time of Onset
Third and Fourth Quarters, 1973

Source	Jul	Aug	Sep	Oct	Nov	Dec	Total	Percent of Subtotal
Mental Institutions	36	48	37	32	81	27	261	4
Indian Reservations	8	50	24	23	4	8	117	2
Other Residences	861	1090	965	1064	980	848	5809	94
Subtotal	905	1188	1026	1120	1065	883	6187	100
Residences Unknown	551	750	744	821	650	584	4100	0
Total	1456	1938	1770	1941	1715	1467	10287	0

B. Nonhuman

For the period July through December 1973, 50 isolations from nonhuman sources were reported; 48 of them were from primates, 1 from a horse, and 1 from an unidentified animal (Table IV).

III. CURRENT TOPICS

Shigellosis in the United States, 1964-1973

The following discussion is excerpted from a paper by J. B. Weissman, et al, "Shigellosis in the United States, 1964-1973," currently in press.

Shigella surveillance at CDC is based upon voluntary reporting of culture-proven cases; thus, the actual prevalence of shigellosis in the United States is higher than the isolations reported between 1963 and 1973 indicate. Reported isolations are the results of many steps in a reporting system that begins with the patient's decision to seek medical advice, the physician's decision to obtain a culture, the different capabilities of many laboratories performing enteric isolations, and the reporting of positive isolates from local centers through the state to CDC. In spite of these biases of underreporting, consistency from 1 year to the next and several clearly delineated trends enable us to draw certain epidemiologic conclusions from these data.

Shigellosis is characteristically a disease of the young. Because infected preschoolers have not yet acquired satisfactory hygienic practices, those who come in contact with them are at increased risk of acquiring infection. Preschoolers account for high attack rates in nurseries and day-care centers; mothers of young children are at increased risk and account for higher attack rates in families where a preschooler is ill than in families with illness where there are no preschool children present.

The importance of adequate sanitation and sound hygienic practice is underscored by the extraordinarily high incidence of shigellosis in custodial institutions, where the intellectual limitations of residents often makes good hygiene impossible, and on Indian reservations, where lack of satisfactory water and sewerage systems and inadequate health education contribute to fecal-oral spread. The association of crowded living conditions, delapidated housing, and poverty is reflected in the high rates of shigellosis in urban areas, particularly among lower socioeconomic groups. The emergence of S. sonnei as the predominant serotype in the United States follows a pattern similar to that seen in Western Europe and Japan, where increasing urbanization has also occurred in recent years.

The rapid spread of S. dysenteriae-1 throughout Central America, beginning in 1969 and reflected by increased number of cases reports in the United States, can be attributed to a combination of several factors: a highly susceptible population, an environment favoring transmission of the bacteria, and the possibility of increased virulence in the organism itself. Enhanced bacterial virulence has been hypothesized and may play an important role in epidemics of shigellosis caused by multiply-resistant organisms where antibiotic resistance is episomally mediated.

Attempts to develop a safe, effective vaccine conferring immunity to shigellosis have been hampered by the serotype-specificity of these agents, the need for repeated immunization, and the short duration of a satisfactory level of immunity. In settings where a limited number of specific serotypes presistently predominate, where the risk of acquiring shigellosis is known to be high, and where improvement in hygiene or sanitation would be formidable--such as in custodial institutions or on some Indian reservations--a safe and effective vaccine may be an important adjunct to other preventive measures. Even in these settings, however, unpredictable changes in predominant serotypes from time to time limit the potential usefulness of a serotype-specific vaccine. In areas where hyperendemic levels of disease are present, improvements in water and sewerage systems coupled with effective public health education may be a far more satisfactory long-term approach to the problem.

IV. REPORTS FROM THE STATES

Two Common-Source Outbreaks of Shigellosis

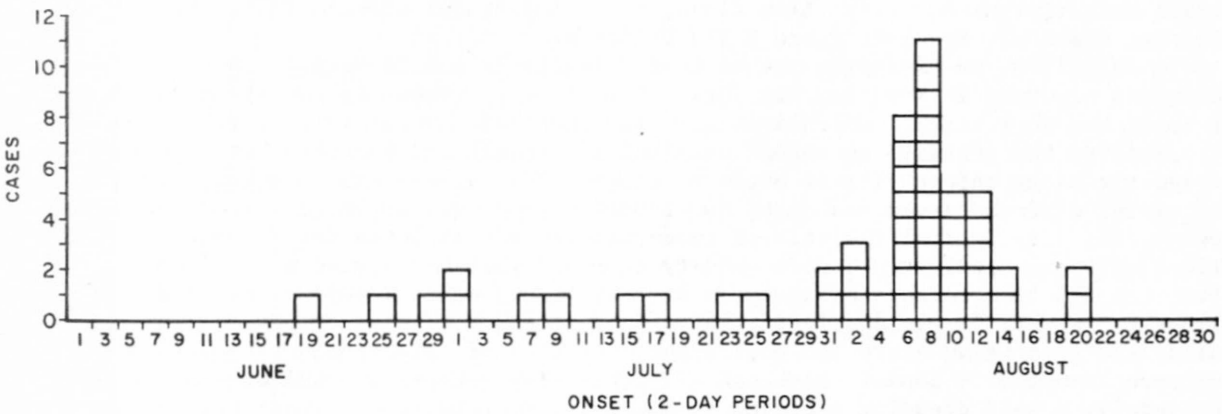
Person-to-person spread is traditionally the most frequent form of transmission of shigella infection; common source outbreaks, however, do occur and generally account for large numbers of cases occurring in discrete geographic areas over a short period of time. Compared with person-to-person spread, common source shigellosis often affects predominantly adults or persons in a wide age range. Reported outbreaks in Pennsylvania and New York illustrate many classic features of common-source shigella outbreaks.

Waterborne Shigellosis -- Bucks County, Pennsylvania

Reported by Rose A. Ionnatta, R.N., Director, Personal Health Services, Agnese Ferrell, Supervisor, Public Health Nursing, Melvin Salzman, Environmental Specialist, Lower Bucks County; Mills Braunlich, Environmental Health Protection Specialist, Lee Thomas, Director, Bureau of Environmental Health, Edmund K. Lindemuth, M.D., Director, Bucks County Department of Health; Wallace E. Turner, Chief, Field Studies Section, Division of Laboratories, William E. Parkin, Chief, Epidemiology Section, W. D. Schrack, Jr., M.D., Director, Division of Communicable Diseases, Pennsylvania Department of Health; and an EIS Officer.

On August 11, 1973, approximately 150 persons attended a wedding reception at a country club in Bucks County, Pennslyvania. Over the next 3 days, 90 of 119 persons interviewed developed a gastorintestinal illness characterized by nausea, abdominal cramps, diarrhea, vomiting, and fever (Figure 3). Among 15 food items served, food-specific attack rates were significantly higher for persons who had consumed water or string beans than for those who had not. Attack rates for persons who had either eaten string beans or drunk water, but not both, revealed that only water was significantly associated with illness ($p < .02$). Stool specimens were obtained from 35 wedding reception guests and 9 grew Shigella sonnei; all isolates were resistant to sulfathiazole.

Fig. 3 GASTROENTERITIS CASES IN COUNTRY CLUB GOLFERS, BY DATE OF ONSET, BUCKS COUNTY, PENNSYLVANIA, JUNE–AUGUST 1973



A questionnaire survey of 139 club members who frequently played golf at the country club but who did not attend the wedding reception was conducted to estimate the extent of illness in persons other than the wedding reception guests. Sixty percent of the 113 golfers responding had experienced a gastrointestinal illness characterized by diarrhea, abdominal cramps, headache, and fever in the previous 3 months; 73% had become ill between July 31 and August 14. A history of drinking water from fountains on the golf course was significantly associated with illness ($p < .01$). At least 6 of the golfers who submitted stool specimens at the time of their illness had positive cultures for S. sonnei.

Water for the country club and the golf course fountains came from an old private, drilled well. The water was routinely chlorinated, but early in July 1973 the automatic chlorinator broke down and was not functioning at the time of the outbreak. Multiple cultures of the water supply at the club showed fecal coliforms, but shigella organisms were not isolated. More than 1,500 golfers played at the club between July 31 and August 14; based on the sample survey results, over 1,000 persons may have acquired shigellosis from the contaminated well.

Editorial Notes: Of 358 waterborne diseases outbreaks reported to federal agencies between 1946 and 1970, 33 (9%) were caused by shigella organisms (1). Most outbreaks involved private water supplies and were caused by direct fecal contamination, back siphonage from a non-potable into a potable water system, or cross-connection between such systems (2). As demonstrated in this outbreak, despite strong epidemiologic evidence and the isolation of shigella from affected individuals, shigellae are rarely isolated from implicated water (3,4).

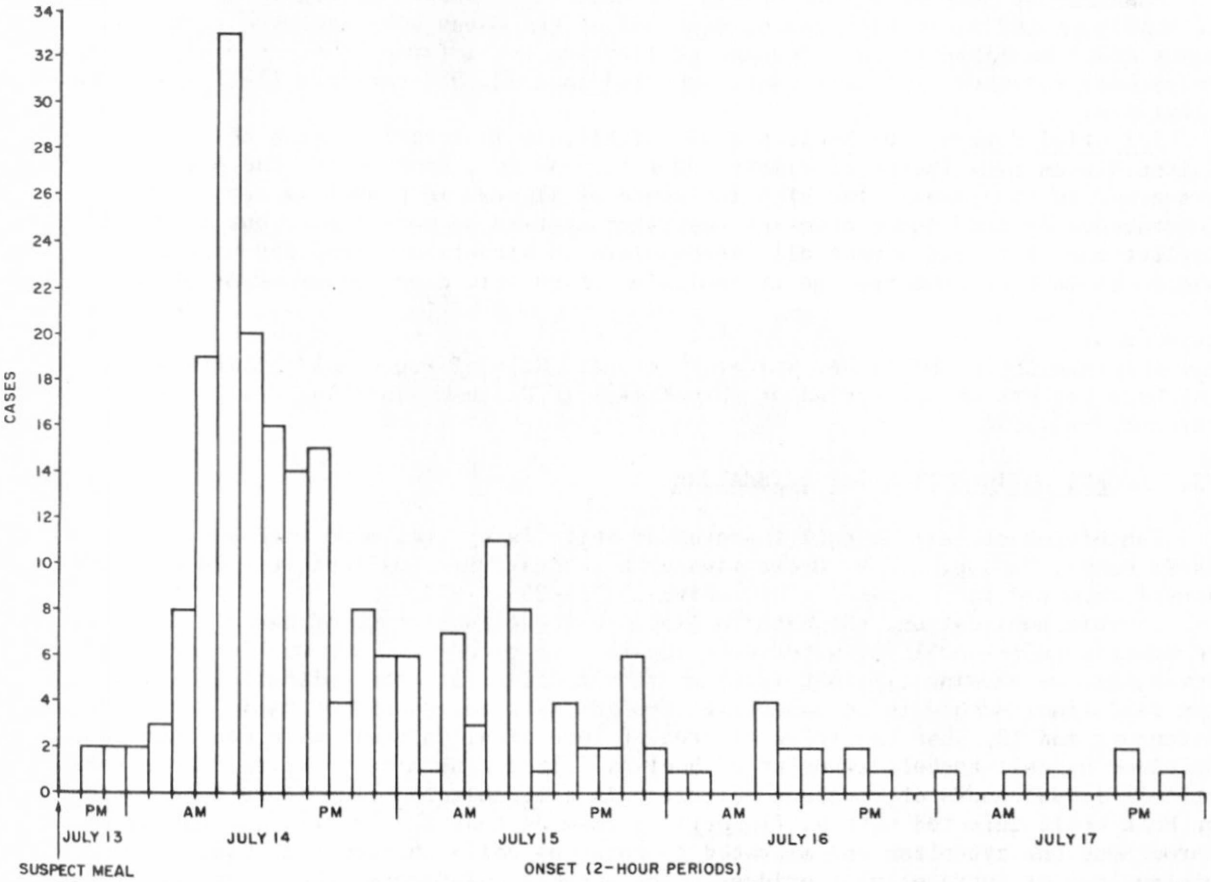
References:
1. Craun GF, McCabe LJ: Review of the cause of waterborne disease outbreaks. JAMA 65:74-84, 1973
2. MMWR 22(3), 1973
3. Drachman RH, Payne FJ, Jenkins AA: An outbreak of waterborne shigella gastroenteritis. Am J Hyg 72:321-334, 1960
4. Green DM, Scott SS, Mowat DAE: Waterborne outbreak of viral gastroenteritis and sonne dysentery. J Hyg (Camb) 66:383-392, 1968

Foodborne Shigellosis -- Kendall, New York

Reported by Glenn E. Haughie, M.D., Director of Health, Paula Mansur, M.D., Medical Supervisor of Child Health, Monroe County Health Department; John Staeble, Administrator, Orleans County Health Department; and Alan Hinman, M.D., Assistant Commissioner for Epidemiology and Preventive Health Services, New York State Department of Health; Patricia Longega, M.D., Epidemiologist, Mexican Institute of Social Security, Mexico City; Alan Glass, M.D., Infectious Disease Unit, Strong Memorial Hospital, Rochester; and 2 EIS Officers.

In July 1973, an explosive outbreak of shigellosis due to Shigella sonnei, with 248 cases occurred in Kendall, New York, a small town between Rochester and Buffalo in upper New York State. Most cases occurred over a 3-day period (Figure 4); nearly all patients had attended an annual carnival in Kendall and had eaten at a smorgasbord served the night before illness began to occur. The overall attack rates, based on the amount of food served indicated about 50% of those who attended the smorgasbord became ill. Statistical analysis of food-specific attack rates for 19 food items served initially indicated a wide variety of foods were associated with illness. After removal from subsequent analysis of those foods most closely correlated with illness, however, it was disclosed that 4 food items--potato salad, cole slaw, egg salad, and tuna salad--were the most likely vehicles of infection. S. sonnei was cultured from 1 of 4 foods. Although all foods were prepared, handled, and served separately, a sald dressing prepared by Kendall residents from a local recipe was used in the preparation of the 4 implicated foods only. It was postulated that 1 person involved in preparing the salad dressing inadvertently contaminated the dressing with shigellae which then multiplied as the foods awaited serving. That person was not identified but it was suspected he or she had an asymptomatic shigella infection acquired indirectly from 1 of the residents of the area who had had shigellosis before the epidemic began.

Fig. 4 CASES OF SHIGELLOSIS, BY TIME OF ONSET, KENDALL FIELD DAYS, JULY 1973



Editorial Notes: Eight of the 21 foodborne outbreaks of shigellosis reported to CDC in 1964-1968 involved over 100 cases (1). In more than half of the outbreaks, the attack rates were over 50%. In 11 of 21 outbreaks the vehicle was identified; salad was responsible in 7 (64%), and potato salad accounted for 5 (46%). Extensive handling of multiple ingredients used in salads followed by inadequate or improper refrigeration probably accounts for the special prominence of salads in the etiology of foodborne shigellosis (1).

References:

1. Donadio JA, Gangarosa EJ: Foodborne shigellosis. J Infect Dis 119:666-668, 1969

V. INTERNATIONAL NOTES

Shigellosis in Israel -- 1972

Abstracted from the Monthly Bulletin of the Division of Epidemiology, Ministry of Health, Tel Aviv, Israel.

Since 1967 the number of cases of shigellosis reported to the Israeli Ministry of Health has increased annually. In 1967, 2202 culture-proven cases of bacillary dysentery were reported; in 1968, 2484 were reported; in 1969, 3140; in 1970, 2932; in 1971, 3247; and in 1972, 4135.

Seasonally, the highest number of cases has been observed in the period from

July to October. More than 70% of isolates were obtained in children under 14 years of age. The highest attack rate, as well as the largest number of cases, was in the 0-4 year age group, with an incidence of 408 cases per 100,000 population in 1972.

Analysis of morbidity data by type of settlement showed no significant changes from 1971 to 1972. In both years, over 50% of the cases were reported from towns and about 20% from Kibbutzim and Qevuzot (collective rural farms) where the highest attack rates were recorded. Of 3247 cases reported in 1972, 667 patients (16.1%) were hospitalized.

Editorial Notes: The incidence of shigellosis in Israel exceeds that in the United States by a factor of almost 100-fold. As in this country, the disease is most prevalent in the young. The high incidence of illness in Kibbutzim may be the consequence of inadequate sewerage and water systems on some farms, but it may also reflect the fact that almost all preschoolers on Kibbutzim attend day-care centers where, as in this country, the transmission of enteric diseases is enhanced (1).

Reference:

1. Weissman JB, Schmerler A, Weirer P, et al: Role of Preschool Children and Urban Day-Care Centers in the Spread of Shigellosis in Urban Communities. J Pediatr 84: 797-802 June 1974

VI. RECENT ARTICLE FROM THE LITERATURE

Inhibition of cell-to-cell transfer of shigella by treatment with some antibiotics. By Y. Osada, T. Une, and H. Ogawa (research laboratories, Daiichi Seiyaku Co., Ltd., Tokyo) reported in: Japan. J Microbiol 17:223-235, 1973

In this publication, the authors examined the capabilities of certain antibiotics to inhibit cell-to-cell transfer of shigella. They reviewed the work of previous investigators showing (1) that invasion of shigellae into the epithelial lining of the intestinal mucosa is an essential step in the pathogenesis of bacillary dysentery and (2) that the infected area of intestinal epithelium is continuously extended by cell-to-cell transfer of bacilli. They also cite in vitro demonstrations of cell invasiveness of virulent shigellae in cell culture--time lapse observations on HeLa cells infected with S. flexneri 2a showing that the bacilli vigorously moved throughout the cytoplasm and migrated to adjacent cells through filopodal-like protrusions or intracellular bridges. The authors underscored the relevance of these observations in the chemotherapy of bacillary dysentery as showing that the intracellular activities of antibiotics which are largely responsible for their effectiveness.

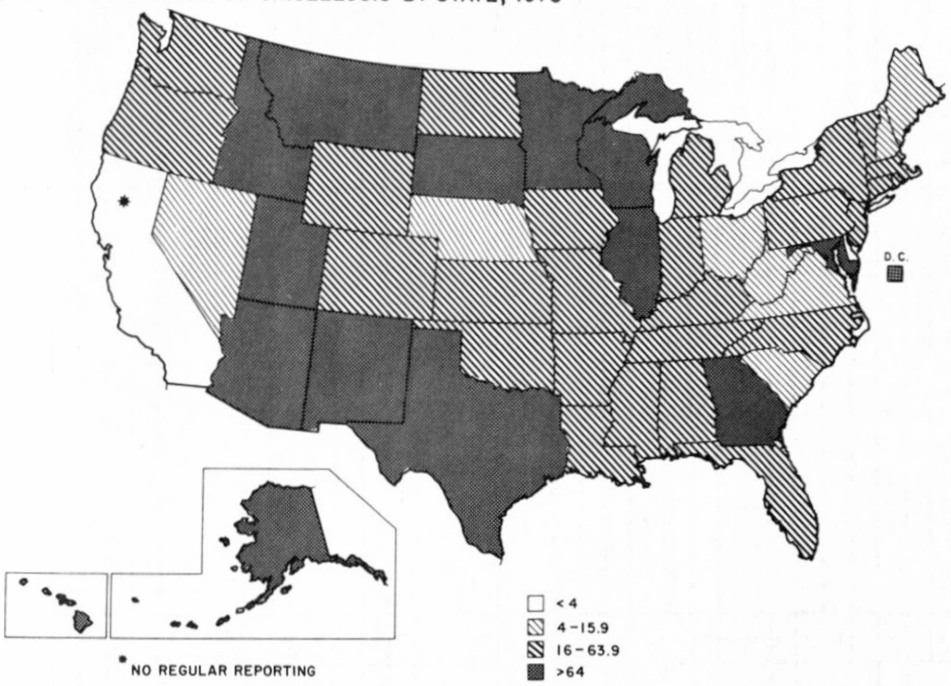
Using a HeLa cell suspension monolayer and a cell culture-infection method they had previously developed, the authors tested the effects of 5 antibiotics--kanamycin, erythromycin, tetracycline, colistin, and rifampicin--on cell-to-cell transfer of avirulent strains of S. flexneri 2a. In cell colonies treated with 3 of the 5 antibiotics, the number of infected cells approximated that of pre-treatment controls, indicating that these antibiotics--tetracycline, erythromycin and rifampicin--inhibited cell-to-cell transfer of intracellular shigellae, whereas colistin and kanamycin did not. This may account for the greater clinical effectiveness of tetracycline, erythromycin and rifampicin in the treatment of bacillary dysentery.

Editorial Notes: The importance of invasion of the intestinal epithelium in the pathogenesis of shigellosis cannot be over emphasized. This study sheds further light on the behavior of the bacilli once they have become intracellular. The well-known ineffectiveness of orally administered non-absorbable antibiotics such as gentamicin, and kanamycin in treating shigellosis despite their apparent effectiveness in vitro, may be due to the fact that these drugs do not achieve sufficient intracellular concentrations to inhibit cell-to-cell transfer of bacteria.

VI. SHIGELLA SURVEILLANCE: ANNUAL SUMMARY FOR 1973*

In 1973, a total of 16,868 isolations of shigella was reported to CDC. This was an increase of 23% over the 13,752 isolations reported in 1972. Utilizing the population estimates for July 1, 1972, the overall United States attack rate was 89.5** reported isolations per million population in 1973, compared with 66.0 and 63.6 reported isolation in 1972 and 1971, respectively. Attack rates by state are shown in Figure 5.

Fig. 5 ATTACK RATES OF SHIGELLOSIS BY STATE, 1973



The age and sex distribution of persons from whom shigella was isolated in 1973 is presented in Table V. Children 1 to 4 years of age were at greatest risk, with an attack rate of 213.6 per million.

The seasonal distribution of previous years persisted, with the greatest number of isolates reported each autumn (Figure 2).

Table VI shows the relative frequency of all shigella serotypes reported in 1973. The trend toward an increasing proportion of all isolates being S. sonnei continued as it has since the fourth quarter of 1966. In 1973, 83.6% of all reported shigella isolations were S. sonnei versus 78.8% in 1972, and 76.1% in 1971. Concomitantly, S. flexneri has progressively decreased in proportion of total isolations.

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*This summary is based upon preliminary reports compiled quarterly through December 31, 1973. Additions or corrections will be published in a subsequent report.

**Since reports were not received on a regular basis from California, the population total of California has been subtracted from the United States population total in calculating this rate.

TABLE I-A

SHIGELLA SEROTYPES ISOLATED FROM HUMANS

THIRD QUARTER, 1973

SEROTYPE	NORTHEAST																									NORTHWEST														
	CONN	DEL	DC	ILL	IND	IOWA	KY	ME	MD	MASS	MICH	MINN	MO	NH	NJ	NY-A	NY-BI	NY-C	OHIO	PA	RI	VT	VA	WVA	WISC	NORTHEAST TOTAL	COLO	IDAHO	KANS	MONT	NEB	NEV	ND	ORE	SD	UTAH	WASH	WYO	NORTHWEST TOTAL	NORTH TOTAL
S. dysenteria																																								
Unspec																										0										2			2	2
1																										0													0	0
2																									2	2													0	2
3				1																						1													0	1
7																										0													0	0
Total	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	0	0	0	0	0	0	0	0	0	2	0	0	2	5
S. flexneri																																								
Unspec		9	1		7	10				7	1	1	10			7	3	10		9			1			76	17						2	6	34			1	60	136
1 Unspec							1		1				1												2	5									6	1		7	12
1A	1			8							2															11				1									1	12
1B				2						1																3		2											2	5
2 Unspec													2		2										2	6										2			2	8
2A	17			9						2	17	3			18				5	1						72		3	1	8			5					17	89
2B				3															2							5		3										3	8
3 Unspec													1		3											4			1							2		3	7
3A				18						4	6				2											30												0	30
3B																										0												0	0
3C	1										5															6												0	6
4 Unspec													2												2	4		1		1						5		7	11
4A				4								1														5				2								2	7
4B																										0		1								1		2	2
5																										0		3										3	3
6				9						2	2	5													2	20	1	4								1	2		8	28
Variant Y																										0											1		1	1
Total	19	9	1	53	7	10	1	0	1	16	33	10	16	0	25	7	3	10	7	10	0	0	1	0	8	247	18	17	2	12	0	0	7	6	34	8	13	1	118	365
S. boydii																																								
Unspec		1															1			1						3								1	3				4	7
1												1														1													0	1
2				1							1	1									4					7									3			3	10
4													1													1												0	1
10	1										1														2	4												0	4
12																										0												0	0
14																										0												0	0
Total	1	1	0	1	0	0	0	0	0	0	2	2	1	0	0	0	1	0	0	1	4	0	0	0	2	16	0	0	0	0	0	0	0	1	3	3	0	0	7	23
S. sonnei	36	6	17	470	45	72	14	4	150	92	112	714	106	3	63	111	31	89	50	156	7		14	2	305	2,669	67	8	65	24		1	7	28	12	12	92	2	318	2,987
Unknown			6			7					2										2	2			1	20				1								6	7	27
TOTAL	**56**	**16**	**24**	**525**	**52**	**89**	**15**	**4**	**151**	**108**	**149**	**726**	**123**	**3**	**88**	**118**	**35**	**99**	**57**	**167**	**13**	**2**	**15**	**2**	**318**	**2,955**	**85**	**25**	**67**	**37**	**0**	**1**	**14**	**35**	**49**	**25**	**105**	**9**	**452**	**3,407**

Table I-A (Continued)

SHIGELLA SEROTYPES ISOLATED FROM HUMANS
THIRD QUARTER, 1973

SOUTHEAST										SOUTHWEST					SOUTH TOTAL	OTHER					TOTAL	PERCENT OF TOTAL	PREVIOUS QUARTER		SEROTYPE
ALA	ARK	FLA	GA	LA	MISS	NC	SC	TENN	SOUTHEAST TOTAL	ARIZ	NM	OKLA	TEX	SOUTHWEST TOTAL		ALASKA	CALIF	HAWAII	VIRGIN ISLANDS	OTHER TOTAL			TOTAL	PERCENT OF TOTAL	
			1						1					0	1					0	3	0.1	1	0.0	*S. dysenteriae* Unspec
		2	1						2	2			3	5	7					0	7	0.1	2	0.1	1
								1	1				3	3	4					0	6	0.1	4	0.1	2
									0				1	1	1					0	2	0.0	3	0.1	3
						1			1					0	1					0	1	0.0	0	0.0	7
0	0	2	1	0	0	1	0	1	5	2	0	0	7	9	14	0	0	0	0	0	19	0.4	10	0.3	Total
	26				1		4	1	32			3		3	35					0	171	3.4	87	2.3	*S. flexneri* Unspec
3			2						5		7			7	12					0	24	0.5	13	0.3	1 Unspec
								4	4	2			10	12	16					0	28	0.6	17	0.5	1A
				1				1	13				6	19	20					0	25	0.5	16	0.4	1B
19		4	6			5			34		16			16	50					0	58	1.1	87	2.3	2 Unspec
				11				10	21	31		4	27	62	83			19		19	191	3.8	118	3.1	2A
									0	2			21	23	23					0	31	0.6	28	0.7	2B
1		5				2			8	2	16			18	26			2		2	35	0.7	11	0.3	3 Unspec
								9	9	21			6	27	36					0	66	1.3	67	1.8	3A
									0	3			2	5	5					0	5	0.1	5	0.1	3B
									0	4			1	5	5					0	11	0.2	5	0.1	3C
		3	1						4		10			10	14					0	25	0.5	11	0.3	4 Unspec
		2		4				2	8	18		1	4	23	31					0	38	0.7	27	0.7	4A
									0	1			2	3	3					0	5	0.1	4	0.1	4B
		1				2			3	1				1	4					0	7	0.1	3	0.1	5
				1				1	2	29	21		18	68	70					0	98	1.9	80	2.1	6
									0					0	0					0	1	0.0	0	0.0	Variant Y
23	26	15	9	17	1	9	4	27	131	127	70	8	97	302	433	0	0	21	0	21	819	16.1	579	15.4	Total
																									S. boydii
									0					0	0					0	7	0.1	3	0.1	Unspec
									0	2				2	2					0	3	0.1	0	0.0	1
									0	3			2	5	5					0	15	0.3	11	0.3	2
									0	2			2	4	4					0	5	0.1	2	0.1	4
									0				5	5	5					0	9	0.2	3	0.1	10
									0	3				3	3					0	3	0.1	0	0.0	12
									0				1	1	1					0	1	0.0	1	0.0	14
0	0	0	0	0	0	0	0	0	0	10	0	0	10	20	20	0	0	0	0	0	43	0.8	24	0.6	Total
26	65	201	166	120	4	48	12	69	711	36	48	38	326	448	1,159	21	1	8	0	30	4,176	82.1	3,134	83.5	*S. sonnei*
									0	1				1	1					0	28	0.6	6	0.2	Unknown
49	91	218	176	137	5	58	16	97	847	176	118	46	440	780	1,627	21	1	29	0	51	5,085		3,753		TOTAL

TABLE I-B

SHIGELLA SEROTYPES ISOLATED FROM HUMANS

FOURTH QUARTER, 1973

SEROTYPE	NORTHEAST																										NORTHWEST													
	CONN	DEL	DC	ILL	IND	IOWA	KY	ME	MD	MASS	MICH	MINN	MO	NH	NJ	NY-A	NY-BI	NY-C	OHIO	PA	RI	VT	VA	W VA	WISC	NORTHEAST TOTAL	COLO	IDAHO	KANS	MONT	NEB	NEV	ND	ORE	SD	UTAH	WASH	WYO	NORTHWEST TOTAL	NORTH TOTAL
S. dysenteriae																																								
Unspec																			1							1													0	1
1																										0													0	0
2				4						1		1														6													0	6
3																										0										1			1	1
4																										0													0	0
Total	0	0	0	4	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	1	0	0	1	8
S. flexneri																																								
Unspec		1	1		6	1				10	1		2	1		3	4	11		1	2		2			46	13		1	21	2	1		15	14			2	69	115
1 Unspec													1													1										3			3	4
1A	1			3						1	1															6							3						3	9
1B				1						1																2		1											1	3
2 Unspec									3				5												1	9										18	7		25	34
2A				6						7	8	2			2											25							2						2	27
2B				3											1				1							5		1											1	6
3 Unspec															11											11			2										2	13
3A	2			13						2	2															19													0	19
3B																										0													0	0
3C											2	1														3													0	3
4 Unspec																									1	1											8		8	9
4A	1									4	1	4														10			1							3		4	14
4B											1															1										14		14	15
5																										0		2										2	2
6				4						1	1															6											2	2	8
Variant X																										0													0	0
Variant Y																										0											1		1	1
Total	4	1	1	30	6	1	0	0	3	26	17	7	8	1	14	3	4	11	1	1	2	0	2	0	2	145	13	4	4	21	2	1	5	15	14	38	18	2	137	282
S. boydii																																								
Unspec											1															1									2		1		3	4
2												1									1					2													0	2
7				1																						1													0	1
10				1																						1											1		1	2
14												1														1													0	1
Total	0	0	0	2	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	1	0	0	0	0	6	0	0	0	0	0	0	0	0	2	0	2	0	4	10
S. sonnei	68	14	33	534	54	43	25	1	102	119	158	703	110	2	55	97	28	93	85	176	15	14	25	16	285	2,855	39	102	45	8	3	0	3	22	11	42	71	2	348	3,203
Unknown			6			2															5	2			1	16												1	1	17
TOTAL	72	15	40	570	60	46	25	1	105	146	176	713	118	3	69	100	32	104	87	177	23	16	27	16	288	3,029	52	106	49	29	5	1	8	37	27	81	91	5	491	3,520

TABLE I-B (Continued)

SHIGELLA SEROTYPES ISOLATED FROM HUMANS
FOURTH QUARTER, 1973

SOUTHEAST										SOUTHWEST					SOUTH TOTAL	OTHER					TOTAL	PERCENT OF TOTAL	PREVIOUS QUARTER		SEROTYPE
ALA	ARK	FLA	GA	LA	MISS	NC	SC	TENN	SOUTHEAST TOTAL	ARIZ	NM	OKLA	TEX	SOUTHWEST TOTAL		ALASKA	CALIF	HAWAII	VIRGIN ISLANDS	OTHER TOTAL			TOTAL	PERCENT OF TOTAL	
									0					0	0					0	1	0.0	3	0.1	*S. dysenteriae* Unspec
			1						1					0	1					0	1	0.0	7	0.1	1
2		1							3				1	1	4					0	10	0.2	6	0.1	2
			3			1			4				2	2	6					0	7	0.1	2	0.0	3
									0				1	1	1					0	1	0.0			4
2	0	1	4	0	0	1	0	0	8	0	0	0	4	4	12	0	0	0	0	0	20	0.4	19	0.4	Total
																									S. flexneri
	56				24		3		83		6		2	8	91					0	206	4.0	171	3.4	Unspec
1			2					1	4		9			9	13					0	17	0.3	24	0.5	1 Unspec
								6	6	1			5	6	12					0	21	0.4	28	0.6	1A
				1					1	10			9	19	20					0	23	0.4	25	0.5	1B
9		7	16			3			35		5			5	40					0	74	1.4	58	1.1	2 Unspec
				9				8	17	15		6	29	50	67			20		20	114	2.2	191	3.8	2A
								1	1	4			9	13	14					0	20	0.4	31	0.6	2B
		3							3	3	4			7	10			5		5	28	0.5	35	0.7	3 Unspec
								4	4	15			6	21	25					0	44	0.9	66	1.3	3A
									0				3	3	3					0	3	0.1	5	0.1	3B
				1					1				1	1	2					0	5	0.1	11	0.2	3C
			1						1		2			2	3					0	12	0.2	25	0.5	4 Unspec
									0	9			3	12	12			1		1	27	0.5	38	0.7	4A
									0					0	0					0	15	0.3	5	0.1	4B
1									1				1	1	2					0	4	0.1	7	0.1	5
			1					4	5	29	10		18	57	62					0	70	1.4	98	1.9	6
									0					0	0			1		1	1	0.0	1	0.0	Variant X
									0					0	0					0	1	0.0			Variant Y
11	56	10	20	11	24	3	3	24	162	86	36	6	86	214	376	0	0	27	0	27	685	13.4	819	16.1	Total
																									S. boydii
	1								1					0	1					0	5	0.1	7	0.1	Unspec
									0	1			2	3	3					0	5	0.1	15	0.3	2
									0					0	0					0	1	0.0	3	0.1	7
									0			1	1	2	2					0	4	0.1	9	0.2	10
									0					0	0					0	1	0.0	1	0.0	14
0	1	0	0	0	0	0	0	0	1	1	0	1	3	5	6	0	0	0	0	0	16	0.3	43	0.8	Total
22	48	172	201	68	18	100	12	130	771	52	20	21	313	406	1,177	6		6		12	4,392	85.6	4,176	82.1	*S. sonnei*
			1						1						1						18	0.4	28	0.6	Unknown
35	105	183	226	79	42	104	15	154	943	139	56	28	406	629	1,572	6	0	33	0	39	5,131		5,085		TOTAL

Table II

Relative Frequencies of Reported Shigella Serotypes,
Third and Fourth Quarters, 1973

Serotype	Number Reported	Calculated Number*	Calculated Percent*	Rank
A. *S. dysenteriae*				
Unspecified	4			
1	8	9	.09	16
2	16	18	.18	12
3	9	10	.10	15
4	1	1	.01	20
7	1	1	.01	20
B. *S. flexneri*				
Unspecified	376			
1 Unspecified	41			
1a	49	93	.90	7
1b	48	91	.88	8
2 Unspecified	132			
2a	304	558	5.43	2
2b	51	94	.91	6
3 Unspecified	63			
3a	110	217	2.11	4
3b	8	16	.16	13
3c	16	31	.30	10
4 Unspecified	37			
4a	65	125	1.22	5
4b	20	38	.37	9
5	11	15	.15	14
6	169	226	2.20	3
Varient X	1	1	.01	20
Varient Y	2	3	.03	19
C. *S. boydii*				
Unspecified	12			
1	3	4	.04	18
2	20	25	.24	11
4	5	6	.06	17
7	1	1	.01	20
10	13	16	.16	13
12	3	4	.04	18
14	2	3	.03	19
D. *S. sonnei*	8,644	8,679	84.39	1
Unknown	42			
TOTAL	10,287	10,285		

*Calculated number is derived by distributing the isolates not serotyped in the same proportion as the distribution of the serotyped isolates.

Table III

Shigella Serotypes Isolated from Patients in Mental Institutions, by State, Third and Fourth Quarters, 1973

State	dysenteriae 2	flexneri (unspecified)	flexneri 1 (unspecified)	flexneri 2 (unspecified)	flexneri 2a	flexneri 2b	flexneri 3 (unspecified)	flexneri 3a	flexneri 3c	flexneri 4a	flexneri 6	sonnei	Varient R (II)	Total
Alabama	2	0	3	0	0	0	1	0	0	0	0	1	0	7
Delaware	0	8	0	0	0	0	0	0	0	0	0	0	0	8
Florida	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Georgia	0	0	1	14	0	0	0	0	0	0	0	3	0	18
Illinois	4	0	0	0	0	1	0	4	0	0	1	44	0	54
Louisiana	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Maryland	0	0	0	2	0	0	0	0	0	0	0	12	0	14
Massachusetts	0	10	0	0	1	0	0	0	0	4	0	2	0	17
Michigan	0	0	0	0	18	0	0	3	5	0	0	12	0	38
Minnesota	0	0	0	0	1	0	0	0	0	2	0	25	27	55
New Jersey	0	0	0	0	1	0	12	2	0	0	0	0	0	15
New York	0	1	0	0	0	0	0	0	0	0	0	0	0	1
N. Carolina	0	0	0	0	0	0	0	0	0	0	0	2	0	2
Oregon	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Pennsylvania	0	0	0	0	0	0	0	0	0	0	0	3	0	3
S. Dakota	0	2	0	0	0	0	0	0	0	0	0	0	0	2
Tennessee	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Utah	0	0	0	12	0	0	0	0	0	0	0	0	0	12
Wisconsin	0	0	0	0	0	0	0	0	0	0	0	11	0	11
TOTAL	6	22	4	28	21	1	13	9	5	6	1	118	27	261

Table IV

Shigella Serotypes Isolated from Non-Human Primate, by State, Third and Fourth Quarters, 1973

	Number		
S. dysenteriae 2	1	rhesus monkey	Michigan
	1	monkey	Maryland
	1	monkey	Wisconsin
	1	rhesus monkey	Connecticut
S. flexneri (unspec)	1	monkey	Maryland
S. flexneri 1a	1	animal (unspec)	Louisiana
	2	monkey	Louisiana
S. flexneri 2 (unspec)	2	monkey	Maryland
	1	monkey	Wisconsin
S. flexneri 2a	1	gibbon	Illinois
	1	monkey	Illinois
	1	monkey	Louisiana
S. flexneri 3 (unspec)	6	monkey	Hawaii
	2	monkey	Wisconsin
S. flexneri 3a	1	primate	Texas
S. flexneri 4 (unspec)	2	monkey	Hawaii
	1	monkey	Maryland
	1	monkey	Wisconsin
S. flexneri 4a	2	monkey	Illinois
S. flexneri 4b	2	rhesus monkey	Illinois
S. flexneri 5	1	gibbon	Illinois
	4	gorilla I	Illinois
S. flexneri 6	4	monkey	Illinois
	1	monkey	Maryland
S. sonnei	1	horse	Virginia
	2	woolly monkey	Texas
	1	monkey	Connecticut
	5	monkey	Illinois

Table V

Shigellosis Cases by Age Group and Sex United States, 1973

Age (Years)	Male	Female	Unknown	Total	Percent	Cumulative Percent	Number of Reported Isolations/ Million Population
Under 1	324	285	11	620	5.00	5.0	185.5
1-4	2,589	2,285	11	4,885	39.31	44.3	351.5
5-9	1,339	1,333	2	2,674	21.52	65.8	143.0
10-19	780	896	3	1,679	13.51	79.3	41.2
20-29	468	907	-	1,375	11.06	90.4	41.8
30-39	284	405	2	691	5.56	96.0	29.7
40-49	96	117	-	213	1.71	97.7	8.9
50-59	41	81	-	122	0.98	98.7	5.5
60-69	21	57	-	78	0.63	99.3	4.8
70-79	23	41	-	64	0.52	99.8	6.7
80 or over	11	16	-	27	.22	100.0	6.4
Subtotal	5,976	6,423	29	12,428			
Child (unspec)	49	41	1	91			
Adult (unspec)	20	58	-	78			
Unknown	2,054	2,141	76	4,271			
TOTAL	8,099	8,663	106	16,868			
Percent	48.3	51.7					

Table VI

Relative Frequencies of Reported Shigella Serotypes, 1973

	Serotype	Number Reported	Calculated Number	Calculated Percent	Rank
A.	*S. dysenteriae*				
	Unspecified	8			
	1	11	13	.08	16
	2	21	25	.15	13
	3	14	16	.09	15
	4	1	1	.01	20
	6	1	1	.01	20
	7	1	1	.01	20
B.	*S. flexneri*				
	Unspecified	559			
	1 unspecified	72			
	1a	83	155	.92	7
	1b	74	138	.82	8
	2 unspecified	294			
	2a	522	980	5.81	2
	2b	108	203	1.20	6
	3 unspecified	97			
	3a	222	389	2.31	3
	3b	16	28	.17	12
	3c	24	42	.25	10
	4 unspecified	55			
	4a	117	205	1.22	5
	4b	31	54	.32	9
	5	17	22	.13	14
	6	303	388	2.30	4
	Varient X	1	1	.01	20
	Varient Y	2	3	.02	19
C.	*S. boydii*				
	Unspecified	16			
	1	4	5	.03	18
	2	33	40	.24	11
	4	10	12	.07	17
	5	2	2	.01	20
	7	3	4	.02	19
	10	18	22	.13	14
	12	3	4	.02	19
	14	4	5	.03	18
D.	*S. sonnei*	14,047	14,109	83.64	1
	Unknown	74	-	-	
	TOTAL	16,868	16,868	100.02	

STATE EPIDEMIOLOGISTS AND STATE LABORATORY DIRECTORS

The State Epidemiologists are the key to all disease surveillance activities. They are responsible for collecting, interpreting, and transmitting data and epidemiologic information from their individual States. Their contributions to this report are gratefully acknowledged. In addition, valuable contributions are made by State Laboratory Directors; we are indebted to them for their valuable support.

STATE	*STATE EPIDEMIOLOGIST*	*STATE LABORATORY DIRECTOR*
Alabama	Frederick S. Wolf, M.D.	Thomas S. Hosty, Ph.D.
Alaska	Donald K. Freedman, M.D.	Frank P. Pauls, Dr.P.H.
Arizona	Philip M. Hotchkiss, D.V.M.	H. Gilbert Crecelius, Ph.D.
Arkansas	Andrew G. Dean, M.D., Acting	Robert T. Howell, Dr.P.H.
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Delaware	Ernest S. Tierkel, V.M.D.	Mahadeo P. Verma, Ph.D.
District of Columbia	Samuel Khoury, M.D., Acting	Alton Shields, Dr.P.H.
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Georgia	John E. McCroan, Ph.D.	Earl E. Long, M.S.
Hawaii	Ned Wiebenga, M.D.	Albert I. Oda
Idaho	John A. Mather, M.D.	D. W. Brock, Dr.P.H.
Illinois	Byron J. Francis, M.D.	Richard Morrissey, M.P.H.
Indiana	Charles L. Barrett, M.D.	Josephine Van Fleet, M.D.
Iowa	Charles A. Herron, M.D.	W. J. Hausler, Jr., Ph.D.
Kansas	Don E. Wilcox, M.D.	Nicholas D. Duffett, Ph.D.
Kentucky	Calixto Hernandez, M.D.	B. F. Brown, M.D.
Louisiana	Charles T. Caraway, D.V.M.	George H. Hauser, M.D.
Maine	Peter J. Leadley, M.D.	Charles Okey, Ph.D.
Maryland	Anita Bahn, M.D.	Robert L. Cavenaugh, M.D.
Massachusetts	Nicholas J. Fiumara, M.D.	Morton A. Madoff, M.D.
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Minnesota	D. S. Fleming, M.D.	Henry Bauer, Ph.D.
Mississippi	Durward L. Blakey, M.D.	R. H. Andrews, M.S.
Missouri	H. Denny Donnell, Jr., M.D.	Elmer Spurrier, Dr.P.H.
Montana	Martin D. Skinner, M.D.	David B. Lackman, Ph.D.
Nebraska	Paul A. Stoesz, M.D.	Henry McConnell, Dr.P.H.
Nevada	William M. Edwards, M.D.	Paul Fugazzotto, Ph.D.
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Oregon	John A. Googins, M.D.	Gatlin R. Brandon, M.P.H.
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West Virginia	William L. Cooke, M.D.	John W. Brough, Dr.P.H.
Wisconsin	H. Grant Skinner, M.D.	S. L. Inhorn, M.D.
Wyoming	Herman S. Parish, M.D.	Donald T. Lee, Ph.D.

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